

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
15 September 2005 (15.09.2005)

PCT

(10) International Publication Number
WO 2005/086243 A1

(51) International Patent Classification⁷: **H01L 33/00**,
H01S 5/323

(74) Agents: **FUKUDA, Kenzo et al.**; Kashiwaya Bldg., 6-13,
Nishishinbashi 1-chome, Minato-ku, Tokyo 105-0003 (JP).

(21) International Application Number:
PCT/JP2005/004390

(22) International Filing Date: 8 March 2005 (08.03.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2004-063946 8 March 2004 (08.03.2004) JP
60/553,533 17 March 2004 (17.03.2004) US

(71) Applicant (for all designated States except US): **SHOWA
DENKO K.K.** [JP/JP]; 13-9, Shiba Daimon 1-chome, Mi-
nato-ku, Tokyo 105-8518 (JP).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **YASUDA, Takaki**
[JP/JP]; c/o Showa Denko K.K., 1-1, Ohnodai 1-chome Mi-
dori-ku, Chiba-shi, Chiba 267-0056 (JP). **TOMOZAWA,**
Hideki [JP/JP]; c/o Showa Denko K.K., 1-1, Ohnodai
1-chome Midori-ku, Chiba-shi, Chiba 267-0056 (JP).

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG,
KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG,
MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH,
PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,
ZW.

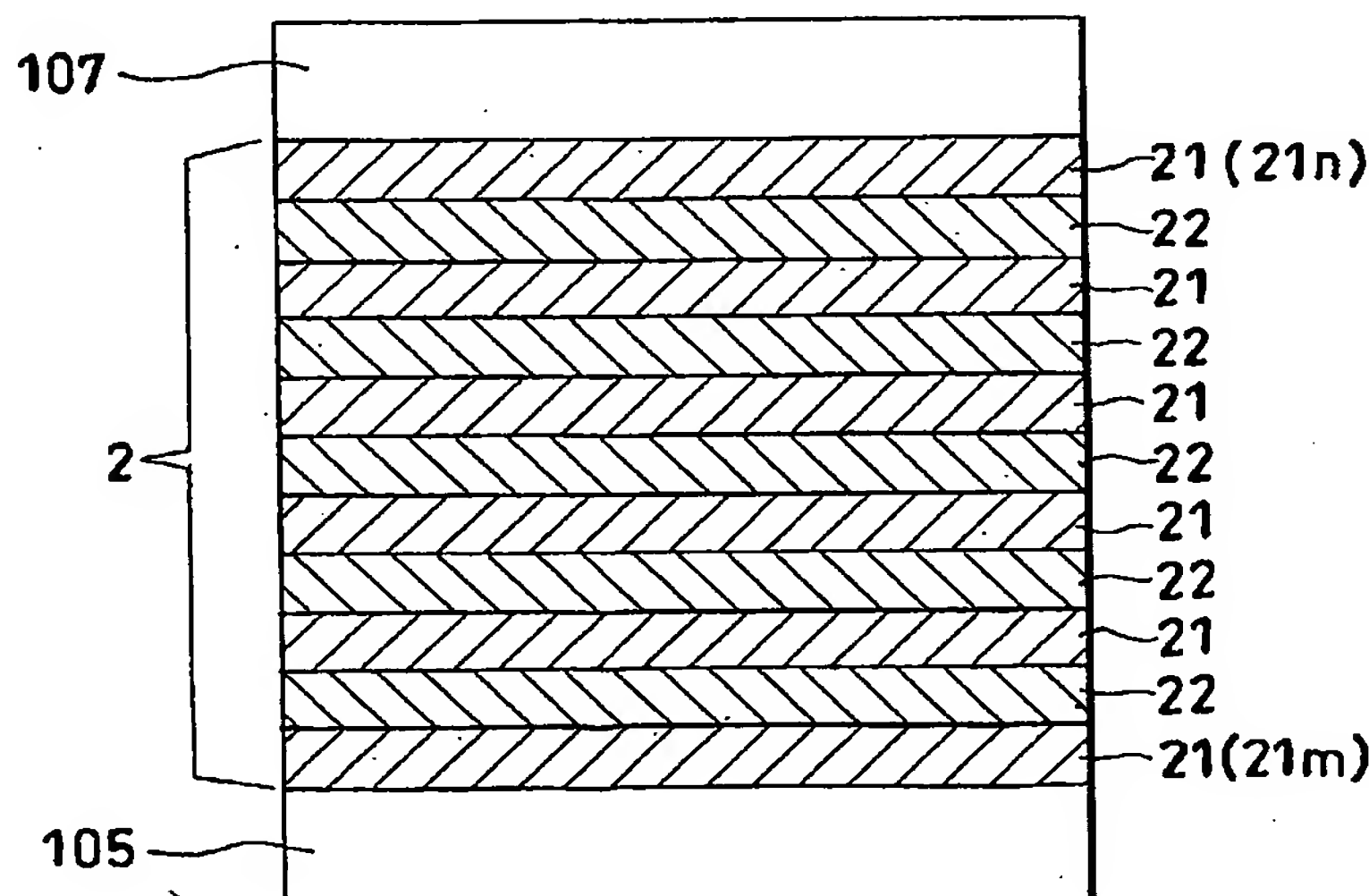
(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO,
SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN,
GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

[Continued on next page]

(54) Title: PN JUNCTION TYPE CROUP III NITRIDE SEMICONDUCTOR LIGHT-EMITTING DEVICE



(57) Abstract: A pn junction type Group III nitride semiconductor light-emitting device 10 (11) of the present invention has a light-emitting layer 2 of multiple quantum well structure in which well layers 22 and barrier layers 21 including Group III nitride semiconductors are alternately stacked periodically between an n-type clad layer 105 and a p-type clad layer 107 which are formed on a crystal substrate and which include Group III nitride semiconductors, in which one end layer 21m of the light-emitting layer 2 is closest to and opposed to the n-type clad layer, and the other end layer 21n of the light-emitting layer 2 is closest to and opposed to the p-type clad layer, both the one and the other end layers are barrier layers, and the other end layer 21n is thicker than the barrier layer of the one end layer.

WO 2005/086243 A1

WO 2005/086243 A1



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.